



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

u

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/001,314	11/14/2001	Chang Gyu Kim	TJK/ 204	2335

26689 7590 06/16/2003

WILDMAN, HARROLD, ALLEN & DIXON
225 WEST WACKER DRIVE
CHICAGO, IL 60606

EXAMINER

BEREZNY, NEAL

ART UNIT PAPER NUMBER

2823

DATE MAILED: 06/16/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/001,314

Applicant(s)

KIM ET AL.

Examiner

Neal Berezny

Art Unit

2823

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 April 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 November 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in-

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

2. Claims 1-4 and 7-10 are rejected under 35 U.S.C. 102(e) as being anticipated by Inoue et al. (6,214,695). Inoue teaches a method for forming an isolation layer of a semiconductor device, col.1, ln.6-8, comprising: providing a silicon substrate in which an active region and a field region are defined; fig.1-6, forming a trench in the silicon substrate within the field region; el.4, forming an insulating layer to be used as the isolation layer on the silicon substrate including the trench, thereby filling the trench with the insulating layer; el.5, forming a capping layer on a resultant entire structure including the insulating layer; el.6, selectively removing the capping layer to expose an upper portion of the insulating layer within the active region; fig.3, el.6, removing the exposed insulating layer within the active region; fig.4, and removing the residual capping layer, so that the isolation layer is obtained from the insulating layer remaining in the trench; fig.5, and wherein the insulating layer has a first portion filled in the trench within the field region and a second portion formed on the silicon substrate within the active

Art Unit: 2823

region, and wherein the first portion is physically separated from the second portion; fig.1, el.5, col.5, ln.21-29. Applicant's attention is directed to Hau et al. (6,475,875) fig.3, el.7, col.3, ln.49-57, which teaches that the physical separation is an inherent property of the structure described. Inoue also teaches that the insulating layer includes a high density plasma undoped silicate glass (HDP-USG) layer; col.1, ln.38-41, wherein the capping layer includes a nitride layer; fig.9, el.7, col.7, ln.38-40, further forming a pad oxide layer and a silicon nitride layer on the silicon substrate; fig.1, el.2, col.1, ln.27-31, and where said pad oxide and nitride layers being later removed; fig.6.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 5-6 and 11-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Inoue as applied to claims 1-4 and 7-10 above, and further in view of Huang et al. (6,191,000). Inoue teaches selectively removing the nitride layer to expose an upper portion of the HDP-USG layer within the active region by using the reverse photo mask as an etch barrier; fig.4, el.5 and 6. It appears that Inoue does not specifically state the embodiment of forming a reverse photo mask on the nitride layer to cover the field region and to expose the active region; nor removing the exposed HDP-USG layer within the active region by using a first wet etching after removing the reverse photo

mask; nor removing the residual nitride layer and the silicon nitride layer by using a second wet etching. Huang teaches forming a reverse photo mask on the nitride layer to cover the field region and to expose the active region; fig.4, el.14, fig.9, el.48, col.1, ln.52-55. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Inoue to use a masking step instead of a CMP step to expose the active regions, because the CMP process is difficult to control depth of the planarization, which could result in either under or over planarization, which could result in failure to expose some active regions or result in exposing some of the field regions, respectively. Either case could result in device failure or degradation. Therefore, it would be obvious to replace the CMP step with a more expensive masking step in order to increase device yields.

5. Huang also teaches removing the exposed HDP-USG layer within the active region by using a first wet etching and removing the residual nitride layer and the silicon nitride layer by using a second wet etching; fig.10, el.60, col.3, ln.41-48. It would have been obvious to one of ordinary skill in the art at the time of the invention to employ the well known steps of etching oxides and nitrides by wet etching, as taught by Huang, in order to reduce the burden on the plasma etching equipment, so it could be used for critical anisotropic etches instead of for blanket isotropic etches, thus reducing equipment and process costs.

Response to Arguments

6. Applicant's arguments filed 4/21/03 have been fully considered but they are not persuasive. Applicant asserts that examiner's 102 rejection is improper because applicant alleges that two references are being combined. Applicant is in error. The 102 rejection is based on only one reference, i.e. Inoue, but the rejection does include an assertion of inherency. Examiner is merely citing a reference to support Examiner's inherency assertion, which is proper under USC 102. Hau teaches that when one deposits an oxide on a nitride film, the sidewalls of a trench structure do not adhere the oxide, thus forming a separation in the oxide film between the top and bottom of the trench structure. Hau teaches an inherent property of oxides on nitrides. There is no combination of references and no issue of obviousness, hence a 103 rejection is not appropriate.

7. Applicant also argues that Examiner's 103 rejection of claim 14 is unobvious on the grounds that the cited references teach the use of a CMP process and applicant's invention is intended to prevent damage from CMP processes, thus uses an etching process in place of CMP processes. Applicant then concludes that a CMP process teaches away from the invention. Applicant is reminded that the Examiner is required to interpret the claims as broadly as possible, and that the rejection is based on the claims and not the specification. Claim 14 has no limitation precluding the use of a CMP process. It is noted that the features upon which applicant relies, i.e. exclusion of CMP processes, are not recited in the rejected claim(s). Although the claims are interpreted

Art Unit: 2823


in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

8. Further, the issue is not whether the references are compatible with the invention, but rather if the references are compatible with each other and if their combination would be obvious to produce the **claimed** invention. Finally, the Examiner need not have the same reason for combining elements as applicant. The fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985).

Conclusion

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of


Dilip Chaudhary
Supervisory Patent Examiner
Technology Center 2800